

valley, 5th, 10th, 19th, 23d, 29th; Missouri valley, Huron, Dak., 23d; Northern slope, North Platte, 1st, 24th; Middle slope, 6th, 24th, 26th, 29th; Southern slope, Fort Griffin, 19th; Northern plateau, Umatilla, 2d, 12th; North Pacific coast region, Albany, Or., 13; Middle Pacific coast region, 5th, 12th, 26th, 27th.

*Mirāge*.—Northport, Mich., 13th; Indianola, 2d to 4th, 6th, 12th to 14th, 20th, 22d to 23th.

## MISCELLANEOUS PHENOMENA.

*Meteors*.—Yuma, Ariz., 2d, 8 p. m., started from the constellation "Andromeda" at an altitude of 50°; pursued a southeasterly course, and disappeared near the "Pleiades." It started slowly and gradually increased in speed, leaving behind a long train of whitish red color. Louisville, 16th, 7 p. m., very large; made its appearance in eastern sky, about 45° above horizon, and shot over toward the west. When about in the zenith, the head of the meteor seemed to expand, becoming much greater in size and brilliancy. It disappeared in the west, leaving a track behind that remained faintly luminous for fifteen minutes. Wytheville, Va., 2d, 9 p. m., a large meteor was observed at an altitude of 15° or 20° above the horizon in the southeastern sky. Its size was, apparently, equal to that of the full moon. It left a train of hazy white, which disappeared shortly after its flight. Eastport, 20th, very bright, first observed in northern sky; pursued an easterly course; duration of flight, about five seconds. Vevay, Ind., 16th, 7 p. m., very brilliant; illuminated the city and adjacent country. Its course was from zenith to a south-westerly point, where it bursted like a rocket. Meteors worthy of less note have been reported as follows: Umatilla, Oreg., 15th; Boise City, Idaho, 8th, 9th, 22d; Pigeon, Nev., 27th, 28th; Yuma, Ariz., 25th; Davenport, 28th; La Crosse, 24th; Springfield, Ill., 11th; Detroit, 20th, numerous; Rio Vista, Cal., 4th, very brilliant; Southington, Conn., 13th, 14th, 15th; New Corydon, Ind., 2d; Vevay, 5th, 12th to 16th, 19th, 22d, 30th; Monticello, Iowa, 12th, 13th, 14th, 17th; Clinton, Iowa, 15th; Woodstock, Md., 13th, 15th; Springfield, Mass., 15th; Fall River, Mass., 20th; Fayette, Miss., 13th, 27th; Corning, Mo., 8th; Arco, N. J., 16th, 22d; Freehold, N. J., 6th, 14th, 22d; Moorestown, N. J., 13th; Vineland, N. J., 15th; Jacksonburg, O., 16th; Fallsington, Pa., 14th; Stateburg, S. C., 9th, 13th, 14th; Clarksville, Tex., 10th, 13th, 20th.

*Earthquakes*.—San Francisco, 11th, 4 p. m., slight shock; 13th, 11.20 p. m., slight shock of about twenty seconds duration. Carson City, Nev., 9th, 10 a. m., sharp shock of two seconds duration; motion from north to south. Berne, Switzerland, 18th, two heavy shocks during the night. Cologne, Prussia, 18th, violent shock of short duration occurred during the night, and slight tremors were felt for several hours after it. On the same night two shocks were felt at Bonn, Germany. These earthquakes originated at Zurich and passed in two waves through western Germany towards Holland. Agram, Austria, 15th, three shocks of earthquake were experienced during the night. Messina, Italy, 16th, two shocks, the first at 1 a. m. and the second at 5.40 a. m.; considerable loss of life and property in the interior. These shocks were felt at Naples, Catanazaro and Cozenza. Pesth, Hungary, 15th, three shocks were experienced during the night. Island of Chios, off the west coast of Asia Minor, near Cape Bianco, 11th, during past week very heavy shocks occurred and the village began sinking into the earth; town abandoned. Chilcoot, Alaska, Oct. 2d, 1.30 p. m. light shock; Oct. 6th, 11 a. m., light shock.

*Migration of Birds*.—*Geese flying south*: Ft. Adams, R. I., 11th; Somerset, Mass., 13th; Fayette, Miss., 10th; Clear Creek, Neb., 5th, 8th, 14th; Palermo, N. Y., 13th; Bellefontaine, O., 6th; Portsmouth, O., 4th; Visalia, Cal., 4th, 6th, 18th, 23rd; Red Bluff, Cal., 8th, 13th; Indianola, 11th, 13th, 23rd; Macon, N. C., 20th. *Flying north*: Red Bluff, 25th; Indianola, 3rd. *Ducks flying south*: Clear Creek, Neb., 14th, 16th; Dubuque, 13th; Indianola, 13th, 19th, 20th. *Blackbirds*: Memphis, 9th, 10th; flying south. *Rice birds*: Memphis, 9th, 10th; flying south.

*Polar Bands*.—Ft. Sill, Ind. Ty., 19th; Mobile, 14th; Augusta, Ga., 3rd; Gardiner, Me., 27th, Fayette, Miss., 18th, 30th; Clear Creek, Neb., 6th, 9th, 10th, 12th, 13th, 16th, 20th, 21st, 22d, 25th, 28th; Auburn, N. H., 17th; Wytheville, Va., 3rd, 5th, 6th, 17th, 26th, 29th; New Corydon, Ind., 21st.

*Prairie Fires*.—St. Vincent, Minn., 12th; Huron, Dak., 2d, 3d, 5th, 6th; Clear Creek, Neb., 6th, 17th; Genoa, Neb., 4th; Yankton, 1st, 4th to 6th, 8th, 16th, 22d, 23d, 25th, 28th; Ft. Gibson, Ind. T., 16th.

*Sand Storms*.—Winnemucca, Nev., 14th. San Carlos, Ariz., 19th, heaviest ever seen at this place; continued from 10 a. m., until midnight. Camp Thomas, Ariz., 1st, 7th, 17th, 19th, 24th.

*Sunsets*.—The characteristics of the sky at sunset, as indicative of fair or foul weather for the succeeding twenty-four hours, have been observed at all Signal Service stations. Reports from 178 stations show 5,296 observations to have been made, of which 27 were reported doubtful; of the remainder, 5,269, or 84.3 per cent., were followed by the expected weather.

*Sun Spots.*—The following record of observations has been forwarded by Mr. D. P. Todd, Director of the Lawrence Observatory, Amherst, Mass :

DATE— Nov., 1881.	No. of new—		Disappeared by solar rotation.		Reappeared by solar rotation.		Total number visible.		REMARKS.
	Groups	Spots.	Groups	Spots.	Groups	Spots.	Groups	Spots.	
5, 10 a. m.....	1	2					1	2	
6, 12 m.....	2	2	0	0	1	1	3	3	
10, 9 a. m.....	3	18†					5	20†	
11, 10 a. m.....	0	0	0	0	0	0	5	20†	
15, 2 p. m.....	2	8					3	20†	
16, 3 p. m.....	0	15†	0	0	0	0	3	35†	
17, 10 a. m.....	0	0	0	0	0	0	3	35†	
20, 1 p. m.....	0	0	0	0	0	0	3	35†	
22, 10 a. m.....	1	5	0	5	0	0	4	35†	
24, 10 a. m.....	0	0	1	5	0	0	3	30†	
26, 12 m.....	0	0	0	5	0	0	3	22†	
28, 1 p. m.....	2	12					3	15†	

†Approximated.

Faculae were seen at the time of every observation.

Mr. Wm. Dawson, at Spiceland, Ind., reports as follows: 1st, 1 group, 1 small spot on west side. 6th, 5 groups, 10 spots. 9th, 4 groups, 12 spots. 12th, 4 groups, 14 spots. 13th, 7 groups, 33 spots, 1 large spot near east edge. 28th, 4 groups, 25 spots. Mr. David Trowbridge, at Waterburg, N. Y., reports: 6th, 1 group, 1 spot. 11th, 5 groups, 5 spots; 1 group appeared by rotation. 12th, 6 groups, 6 spots; 1 new group has arisen. 17th, 3 groups, 11 spots; 1 group of large spots. 22d, 2 groups, 11 spots. 28th, 1 group, 1 spot; the large group has disappeared by rotation. Mr. H. D. Govey, at North Lewisburg, Ohio, reports: sunspots were observed on every clear day during the month. They were most numerous on the 13th, 16th, 23d, and least numerous on the 1st, 27th.

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*H. B. Wayne*

Brig. & Bvt. Maj. Gen'l,  
Chief Signal Officer, U. S. A.

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